

COORDINATION/SFCG IWG PLAN

International EESS Wideband Downlink Workshop

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- The Issue: EES Downlink TM capacity
- SFCG Member agencies early coordination: Resolution A12-1 & Rec 14-3
- SFCG Res A22-2: IWG for Utilization of the 8025-8400 MHz Band
- IWG EES Plan of Work
- IWG EES First Outputs
- Conclusions

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The Issue: EESS Telemetry Downlink Capacity

- All EES missions download their payload data through the 375 MHz-wide 8GHz band
- Despite a rather small footprint due to low altitude (400-1000km), interference cases are reported due partly to the high latitude of the Earth stations
- Number of EE satellites expected to grow
- Emerging family of wide-band users with data rates of 1Gbps+
- A new band (25.5-27 GHz) has been allocated to EESS and needs to be populated
- Limited X-band resource must be carefully managed as a number of EE missions cannot move to the Ka-band for cost or operational reasons

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SFCG Member agencies early coordination

- Resolution A12-1
Establishment of Procedures for Inter-Agency Frequency Coordination
Includes in annex the ***SFCG Manual of Procedures for Inter-Agency Frequency Coordination***
- Recommendation 14-3R4
Use of the 8025-8400 MHz Band by Earth Exploration Satellites
Recommends:
 - that transmitters on Earth Exploration Satellites radiate only when transmitting data to one or more Earth stations
 - that consultations be effected if unwanted emissions from an Earth Exploration Satellite exceed the deep space interference criterion of -220.9 dBW/Hz into a deep space receiver in the band 8400-8450 MHz

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SFCG Resolution A22-2: IWG for Utilization of the 8025-8400 MHz Band (September 2002)

Considers multiple approaches to enhance the spectrum utilization of the X-band, e.g.

- bandwidth limitation
- Channelization
- emissions masks
- orbit spacing of the ascending nodes
- operational coordination
- Earth station antenna size or off-axis antenna pattern fall-off

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SFCG Resolution A22-2: IWG for Utilization of the 8025-8400 MHz Band

Resolves to create the IWG [X-Band EES]

- To conduct studies to determine the potential for future interference between missions in the 8025 – 8400 MHz band
- To determine technical and operational characteristics that will lead to the efficient and effective use of the band
- To evaluate the need for band channelization, establishing maximum bandwidth limitations, and regulating other technical or operational parameters of future EES systems
- To assess the need for a more rigorous and early coordination process
- To provide the status and results of the above studies to the SFCG-23
- To review the adequacy of SFCG Rec 14-3R4

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IWG EES Plan of Work

1. Collect and synthesize technical and operational characteristics of existing and planned missions in the 8025-8400 MHz band
2. Collect and synthesize data on commercial EES systems and associated ground stations, relevant interference studies, ...
3. Be a focal point for and stimulate relevant studies to be performed within the agencies on the subject
4. Review the status of agencies plans for Ka-band deployment

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IWG EES First Outputs

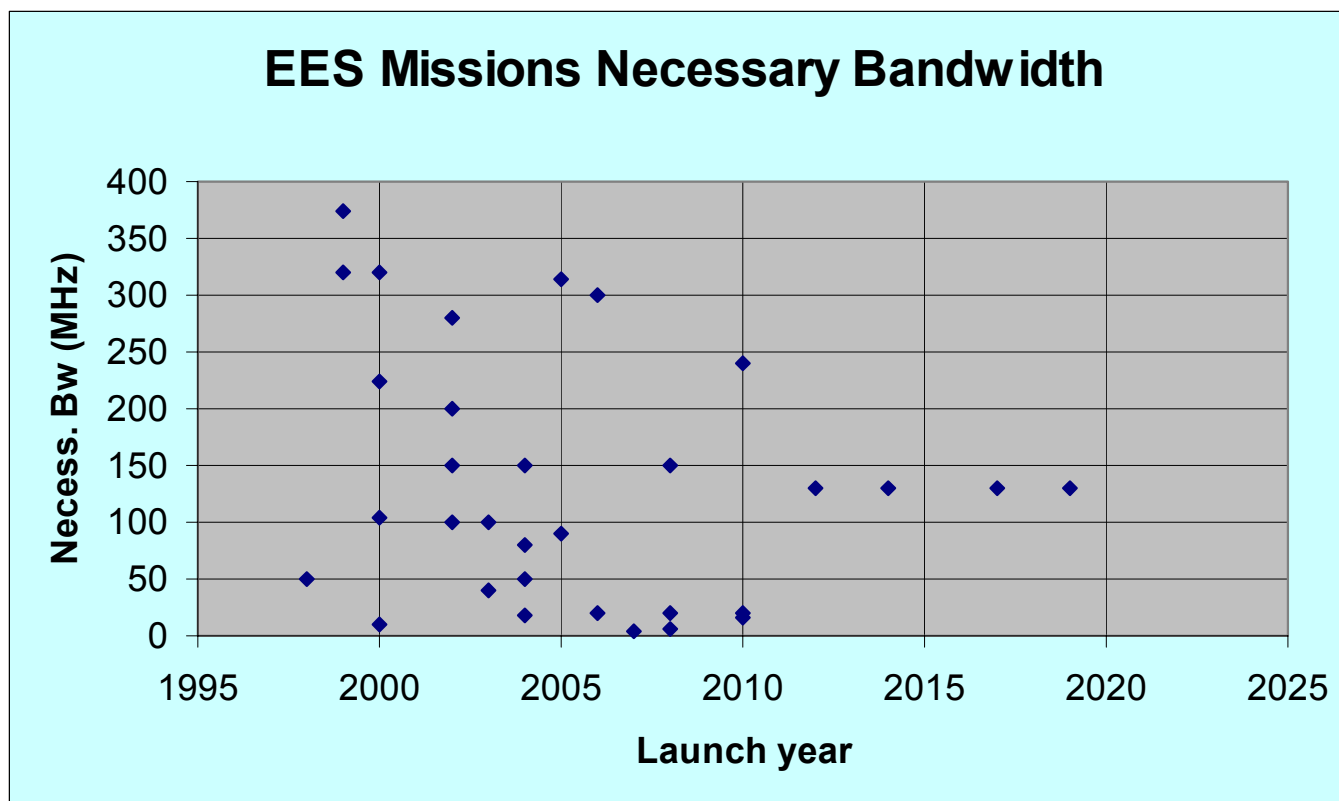
- Data received from three agencies: CNES, NASA and ESA
- Reference 32 satellites

SPECTRA	ADM AEOLUS	MYRIADES	NPP
TerraSAR-L	EarthCARE	CALIPSO	CORIOLIS
PLEIADES	SMOS	TERRA	GOES R-U-1
IKONOS	EGPM	AURA	GOES R-U-2
QUICKBIRD	FUEGO	AQUA	GOES R-U-3
ENVISAT	WALES	ICESAT	GOES R-U-4
EROS_B	SPOT-4	LANDSAT-7	GIFTS-IOMI
CRYOSAT	SPOT-5	EO-1	SAC-C

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IWG EES First Outputs

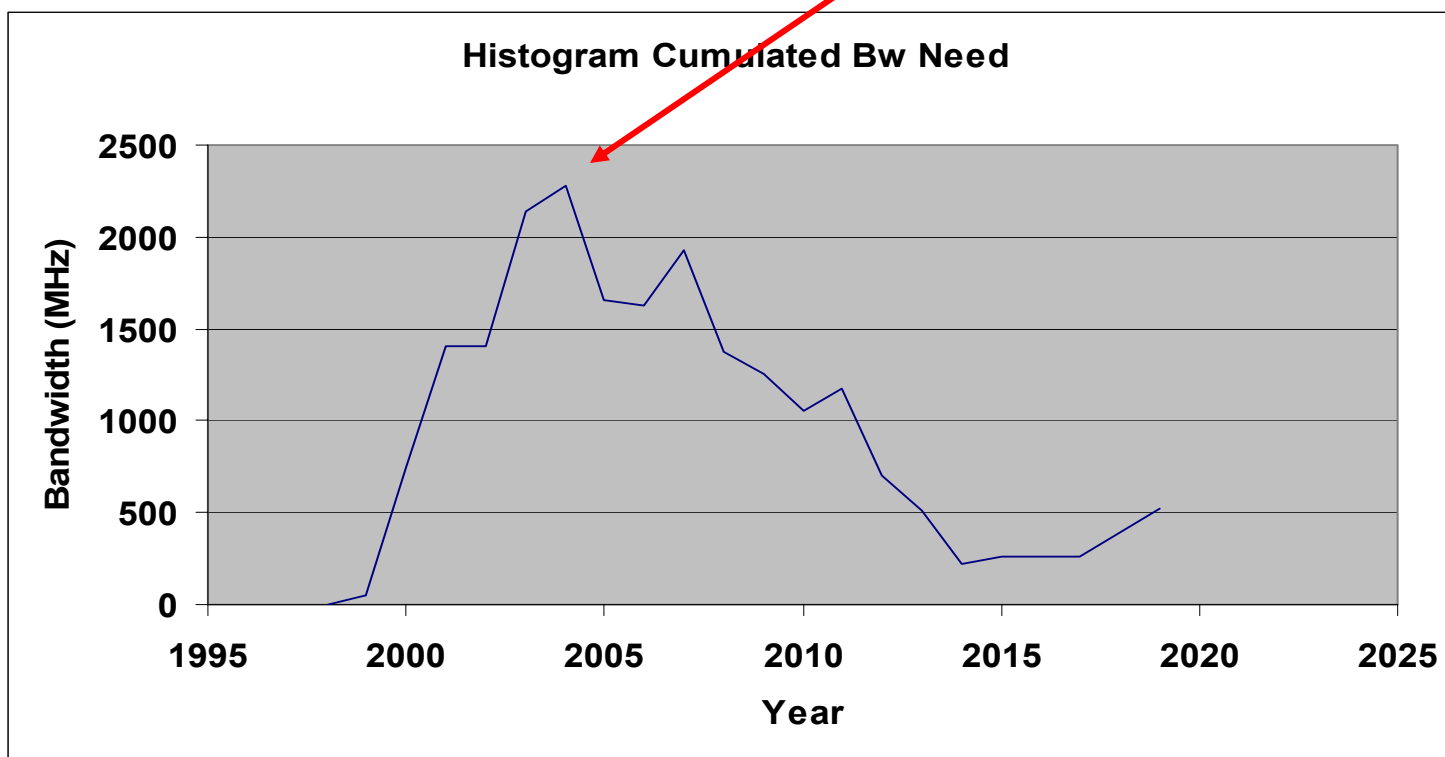
Missions distribution vs launch date and necessary bandwidth



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IWG EES First Outputs

Yearly cumulated necessary bandwidth



- Decrease with time reflects lack of information for far future

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Conclusions

- Current data are incomplete. Commercial satellites missing. Inputs from some agencies not available yet
- Simulation studies on interference scenarios are key to determine the degree of risk of interference conflicts
- Need to optimize utilization of the X-band as it will long remain the best (unique) economical solution for many future missions
- Need to prepare the transition to Ka-band for future wide-band missions. Ground infrastructure deployment is key.